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Description of two new species of the genus *Afraflacilla* Berland et Millot, 1941 (Araneae: Salticidae) from India

Описание двух новых видов рода *Afraflacilla* Berland et Millot, 1941 (Araneae: Salticidae) из Индии

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KEY WORDS: Aranei, jumping spiders, taxonomy, distribution, Thar Desert, Wayanad Wildlife Sanctuary.

КЛЮЧЕВЫЕ СЛОВА: Aranei, пауки-скакунчики, таксономия, распространение, пустыня Тар, заповедник Ваянад.

ABSTRACT: Two new species of jumping spiders, *Afraflacilla miajlarensis* sp.n. and *Afraflacilla kurichiadensis* sp.n. are described from India. Detailed morphological description, diagnostic features and illustration of the species are given. The current distribution records of the genus in India are mapped as well.

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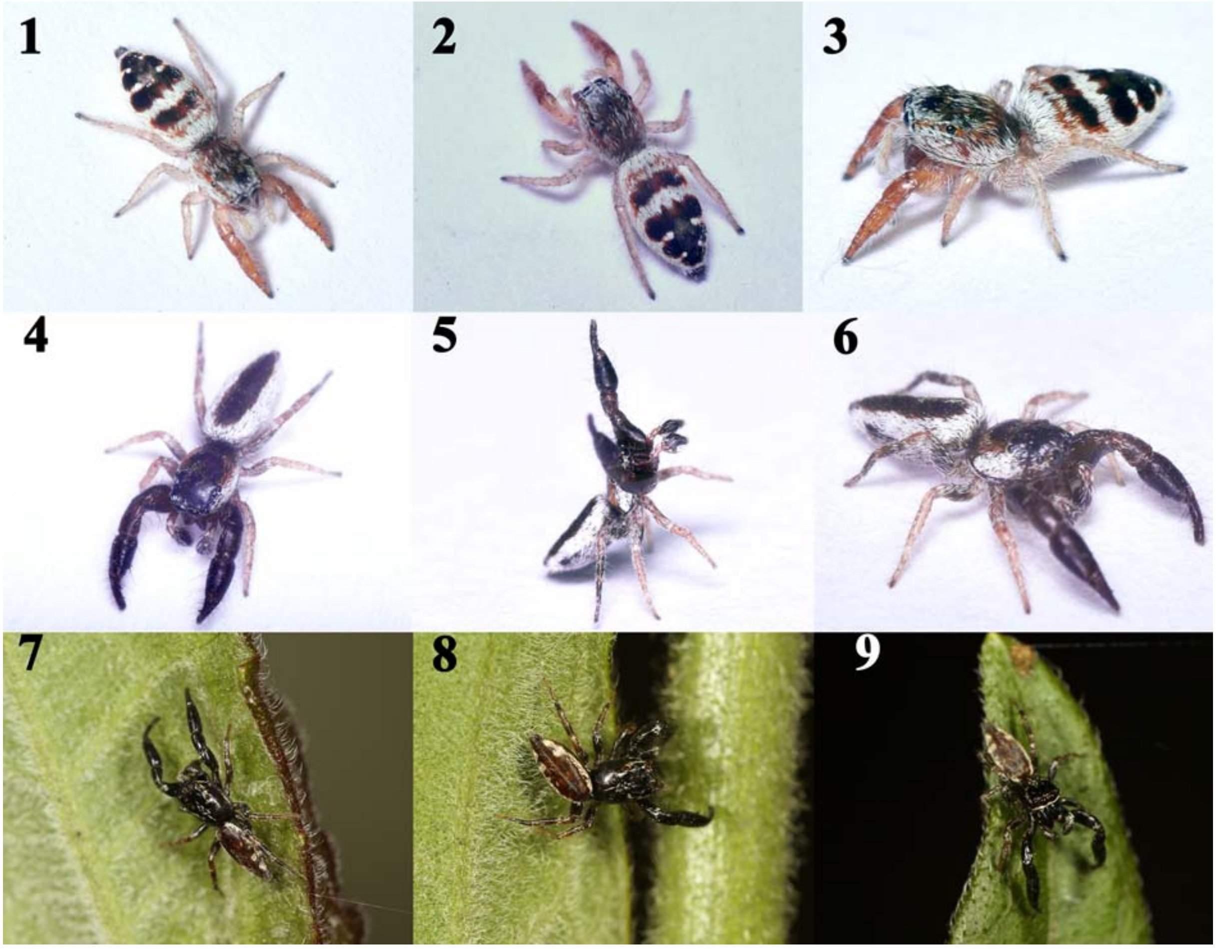
РЕЗЮМЕ: Из Индии описаны два новых вида пауков-скакунчиков, *Afraflacilla miajlarensis* sp.n. и *Afraflacilla kurichiadensis* sp.n. Даны детальные морфологические описания и иллюстрации видов, указаны их диагностические признаки. Приведена карта находок видов рода в Индии.

Introduction

The chrysilline genus *Afraflacilla* was erected by Berland and Millot in 1941 to include the three new species *A. bamakoi* (from Mali), *A. risbheci* (from Senegal) and *A. similis* (from Senegal). The genus was synonymised with *Pseudicius* Simon, 1885 by Clark [1974], and it was widely accepted by several authors [Andreeva *et al*., 1984; Wanless, 1984; Maddison, 1987; Prószyński, 1987, 1989, 1990; Platnick, 1989]. Later, Żabka [1993] restored the taxonomic validity of the genus by comparing the type species of the two genera. The genus is very similar to *Pseudicius*, but can be easily distinguished from them by the presence of long insemination ducts, distinct epigynal pockets, and a long embolus [Żabka, 1993]. Currently, it comprises 42 valid species, widely distributed in the Ethiopian, Oriental, Palaearctic, Australian regions [Żabka, 1993; WSC, 2022], The genus was recently recorded for the first time from India by Prajapati *et al*. [2021], which was described as a new species *A. banni* Prajapati *et al*., 2021. In the present paper, we describe two new species, *Afraflacilla miajlarensis* sp.n. from Desert National Park Wildlife Sanctuary, Rajasthan, and *Afraflacilla kurichiadensis* sp.n. from Wayanad Wildlife Sanctuary, Kerala in India. The distribution of all Indian *Afraflacilla* species is also mapped.

Materials and methods

The specimens were preserved in 70% ethanol and studied with a Leica M205 C stereomicroscope. The microphotographic images were taken by means of Leica DMC4500 digital camera attached to Leica M205 C stereomicroscope, with the software package Leica Application Suite (LAS), version 4.3.0. LAS montage facility. Terminology of male and female genitalia follows Żabka [1993] and spine positions follow the format of Bosselaers & Jocqué [2000]. All measurements are in mm. Measurement data for palps and legs are as follows: total length [femur, patella, tibia, metatarsus (except palp), tarsus]. Distribution maps were prepared by using the online mapping software SimpleMappr



Figs 1–9. General appearance of *Afraflacilla miajlarensis* sp.n. (1–6) and *Afraflacilla kurichiadensis* sp.n. (7–9): 1–3 — female, 4–9 — male.

Рис 1–9. Общий вид *Afraflacilla miajlarensis* sp.n. (1–6) и *Afraflacilla kurichiadensis* sp.n. (7–9): 1–3 — самка, 4–9 — самец.

[Shorthouse, 2010]. The image plates were prepared using Adobe Photoshop CC version 14.0 x 64. All type specimens are deposited in the reference collection at the Centre for Animal Taxonomy and Ecology (CATE), Department of Zoology, Christ College (Autonomous), Irinjalakuda, Kerala, India.

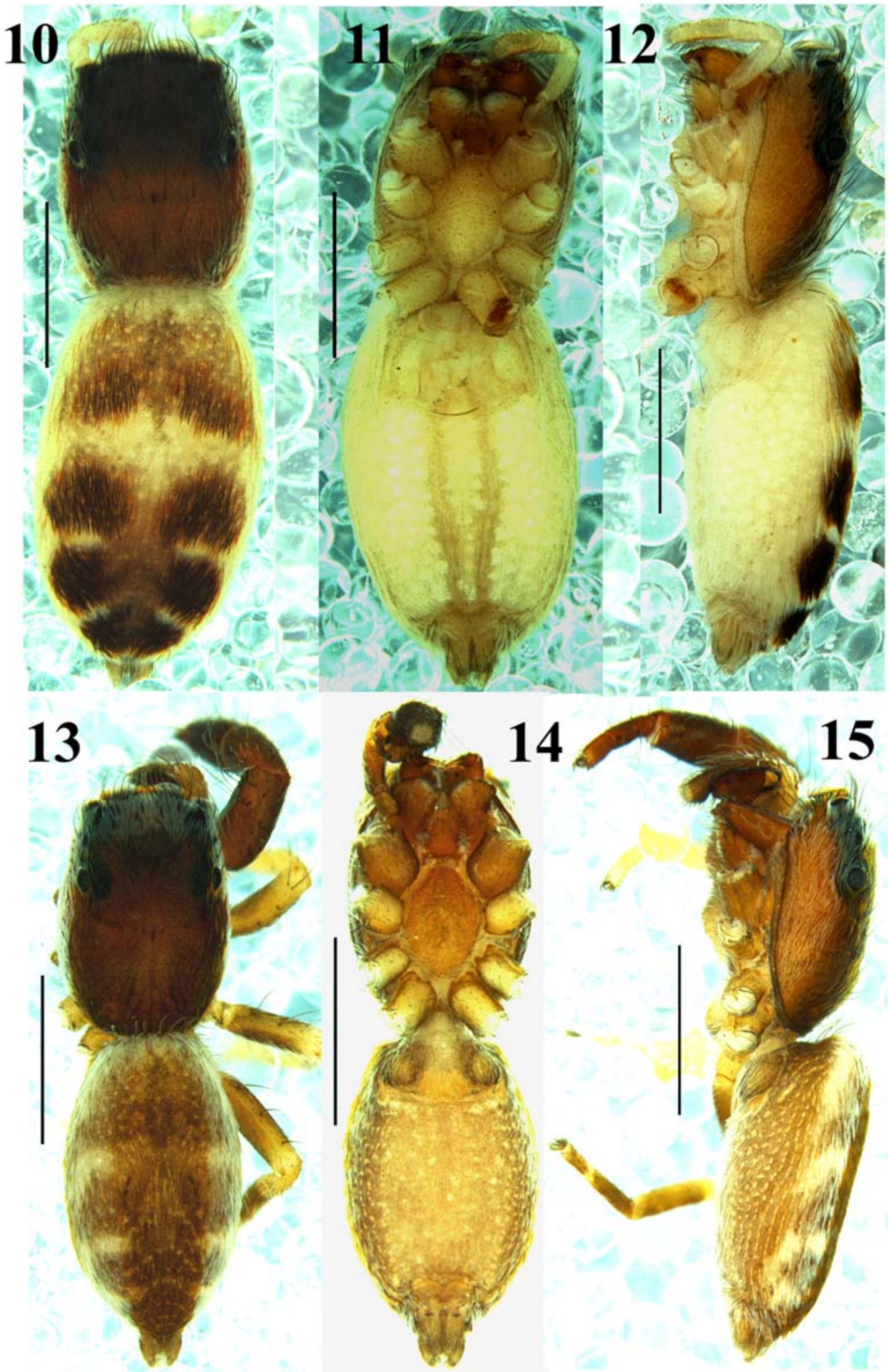
Abbreviations used in the text: AER — anterior eye row, ALE — anterior lateral eye, AME — anterior median eye, do — dorsal, pl — prolateral, plv — prolateral ventral, PLE — posterior lateral eye, PME — posterior median eye, rl — retrolateral, rlv — retrolateral ventral, RTA — retrolateral tibial apophysis; PS — Puthoor Pattammal Sudhin, KN — Karunnappilli Shamsudheen Nafin, AKJ — Ashish Kumar Jangid, RT — Rishikesh Tripathi, MS — Manju Siliwal, AS — Ambalaparambil Vasu Sudhikumar, WON — Web of Nature Research Foundation.

Afraflacilla miajlarensis Tripathi, Jangid, Prajapati et Siliwal, **sp.n.**
Figs 1–6, 10–20, 23–32, Map.

TYPE. HOLOTYPE: ♀ (CATE 8706A) from the Desert National Park Wildlife Sanctuary (26°17′21.16″N 70°26′38.83″E) Miajlar, Jaisalmer District, Rajasthan, India, 130 m a.s.l., 7.12.2018. A.K. Jangid & R. Tripathi. PARATYPES. 1♂ (CATE 8706B), together with the holotype. Additional material examined: 1♂ (WON987B) from the Indroda Nature Park (23°11′36.10″N, 72°38′39.13″E), Gandhinagar, Gujarat, India, 74 m a.s.l., 15.09.2021. D.A. Prajapati.

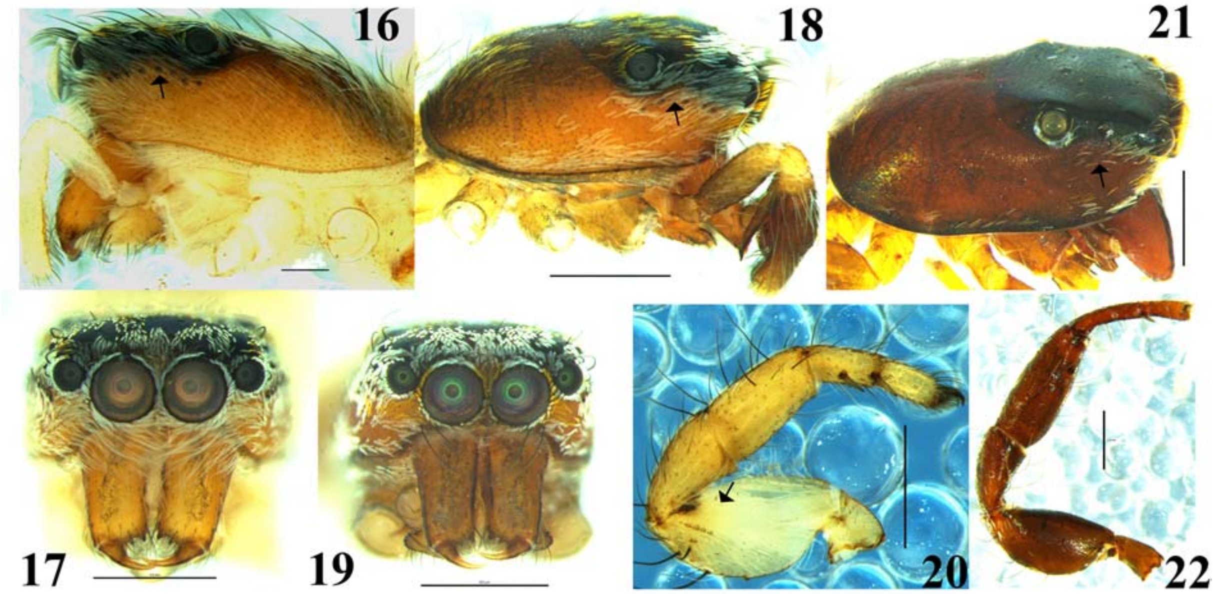
DIAGNOSIS. The female of *Afraflacilla miajlarensis* sp.n. closely resembles *Afraflacilla mushrif* (Wesołowska et van Harten, 2010) by the structure of epigyne, but it can be separated by the following characters: broader and slightly larger epigynal pocket (Figs 23–24, 28–29) (narrow in *A. mushrif*; see Figs 65–66 in Wesołowska & van Harten [2010]); accessory glands slightly bent (much curved in *A. mushrif*). The male is closely similar to *A. arabica* Wesołowska et van Harten, 1994 and *A. braunsi* (Peckham et Peckham, 1903), but can be differentiated by the following combination of characters: cymbium with minor twist apico-retrolateraly (Fig. 26) (much twisted in both *A. arabica* and *A. braunsi*); tegular protrusion directed at 3 o' clock position (directed at 4 o' clock position in both *A. arabica* and *A. braunsi*) (compare Figs 23–32; with figs 65–66 in Wesołowska & van Harten [2010]; figs 6–9 in Wesołowska, & van Harten, 1994, figs 38–39 in Logunov & Zamanpoore [2005], and figs 12–16 in Logunov [1995]).

DESCRIPTION. Female in alcohol (Holotype, CATE 8706A) (Figs 1–3, 10–12, 16–17, 20, 23–24, 28–30) Mea-



Figs 10–15. *Afraflacilla miajlarensis* sp.n.: 10 — female habitus, dorsal view; 11 — same, ventral view; 12 — same, lateral view; 13 — male habitus, dorsal view; 14 — same, ventral view; 15 — same, lateral view. Scale bar: 13–15 — 1 mm.

Рис 10–15. *Afraflacilla miajlarensis* sp.n.: 10 — общий вид самки, дорсально; 11 — то же, вентрально; 12 — то же, латерально; 13 — общий вид самца, дорсально; 14 — то же, вентрально; 15 — то же, латерально. Масштаб: 13–15 — 1 мм.



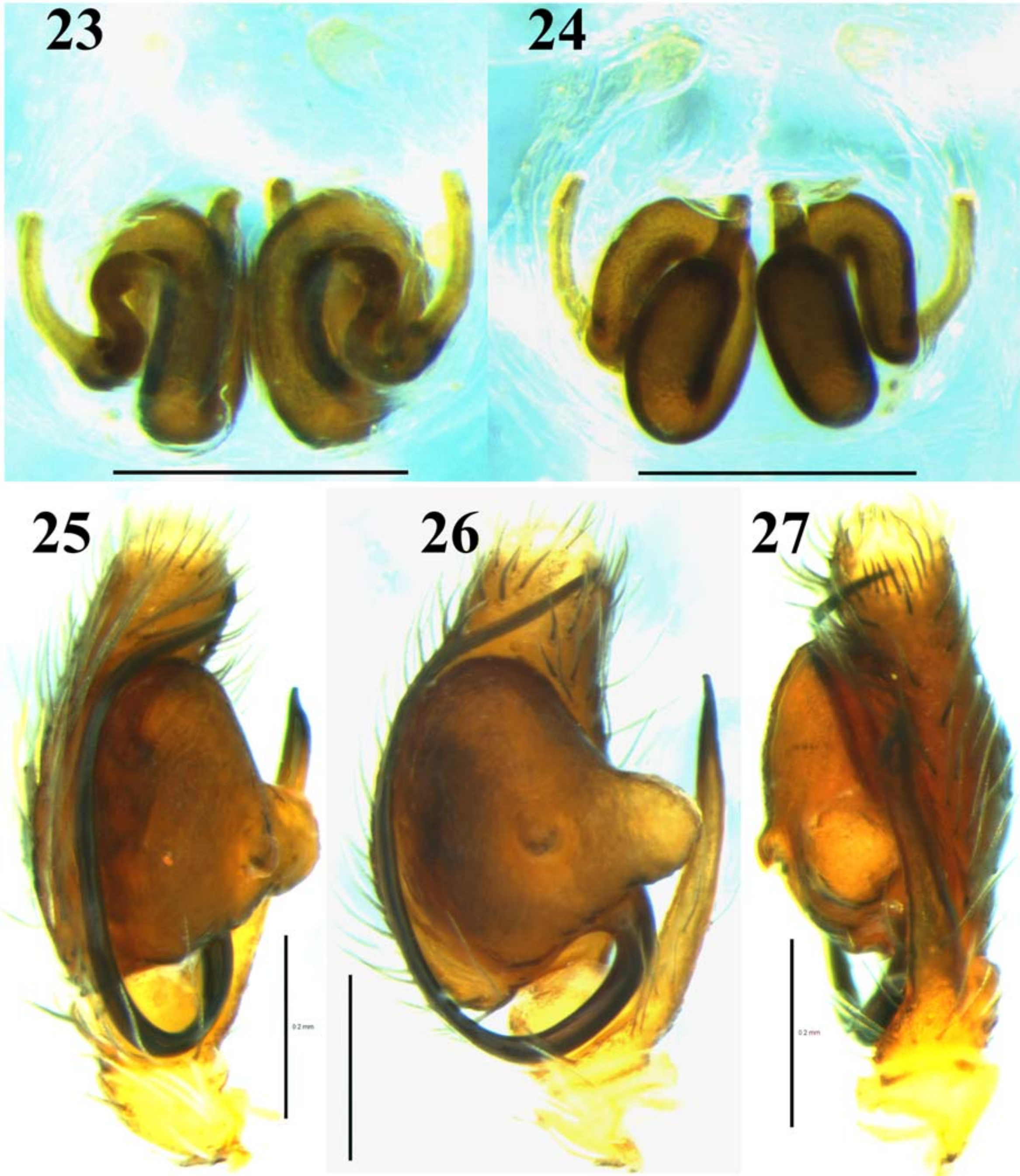
Figs 16–22. *Afraflacilla miajlarensis* sp.n. (16–20) and *Afraflacilla kurichiadensis* sp.n. (21–22): 16 — female carapace, lateral view; 17 — same, frontal view; 18, 21 — male carapace, lateral view; 19 — same, frontal view; 20 — female leg I, prolateral view; 22 — male leg I, prolateral view. Arrows showing stridulatory tubercles. Scale bar: 16 — 0.2 mm, 17–22 — 0.5 mm.

Рис. 16–22. *Afraflacilla miajlarensis* sp.n. (16–20) и *Afraflacilla kurichiadensis* sp.n. (21–22): 16 — карапакс самки, латерально; 17 — то же, фронтально; 18, 21 — карапакс самца, латерально; 19 — то же, фронтально; 20 — нога I самки, пролатерально; 22 — нога I самца, пролатерально. Стрелками показаны стридуляционные бугорки. Масштаб: 16 — 0,2 мм, 17–22 — 0,5 мм.

surements: Body length 3.77. Carapace length 1.43, width 1.09, height at PLE 0.56. Abdomen length 2.35, width 1.27. Ocular area length 0.70, width 0.86. Eye diameters: AME 0.27, ALE 0.14, PME 0.05, PLE 0.14. Eye interdistances: AME–ALE 0.03, PME–PME 0.84, ALE–ALE 0.60, PME–PLE 0.15, PLE–PLE 0.84, ALE–PME 0.21. Length of chelicera 0.69. Measurements of palp and legs: Palp 1.08 [0.37, 0.15, 0.19, 0.37], leg I 2.14 [0.71, 0.37, 0. 51, 0.27, 0.28], II–IV unknown. Carapace oval, rather flattened, burnt orange, with yellowish-orange sides, covered with white hairs and scarce black thin spines (Figs 1–3, 10–12), carapace margin with light brown lines (Figs 12 & 16); ocular region black, slightly wider than long, densely covered with short white hairs, with a row of twenty-one long black curved bristles behind the first row of eyes (Figs 1–3, 10). Clypeus very low, yellowish orange, densely covered with long white setae (Fig. 17). Chelicerae light reddish orange, prolaterally with black longitudinal streaks (Fig. 17); promargin with two closely arranged medial teeth, retromargin with a single tooth. Endites light yellow, longer than wide, broad distally, with grey hairs on their inner margins, dorsally with few brown setae (Fig. 11). Labium light yellowish-brown, with scarce black setae, laterally with light brown mottling (Fig. 11). Sternum oval, creamy yellow, covered with white setae (Fig. 11). Leg I creamy white, covered with setae, and macrosetae. Abdomen oval, creamy white, covered with white setae dorsally, with four pairs of longitudinal thick bands formed of black and orange setae; the last three pairs of bands situated closely in the posterior half of the abdomen, medially with a broad brown longitudinal band (Fig. 10). Venter creamy covered with white hairs, with small white irregular patches, except in the epigastric region, medially with a pair of light brown irregular streaks radiating from epigastric furrow to spinnerets (Fig. 11). Spinnerets light brown, covered with brown hairs.

Epigyne (Figs 23–24, 28–30). Epigyne almost round, with two widely spaced anterior pockets; copulatory openings wide, located just below the epigynal pockets; insemination ducts longer, convoluted; membranous duct forming a loop over posterior spermathecae which leads to a highly sclerotized S-shaped duct and to a larger inverted U-shaped duct, which arise in a spermathecae (Figs 23, 28); accessory gland tubular, less curved, tip directed at 12 o'clock position (Figs 23–24, 28–29). Spermathecae capsule shaped, separated from each other (Figs 24, 29); fertilization ducts laterally oriented (Figs 24, 29).

Male (CATE 8706B) (Figs 4–6, 18, 25–27, 31–32). Measurements: Body length 3.39. Carapace length 1.46, width 1.02, height at PLE 0.54. Abdomen length 1.91, width 1.05. Ocular area length 0.67, width 0.79. Eye diameters: AME 0.24, ALE 0.13, PME 0.04, PLE 0.13. Eye interdistances: AME–ALE 0.02, PME–PME 0.77, ALE–ALE 0.53, PME–PLE 0.15, PLE–PLE 0.71, ALE–PME 0.19. Length of chelicera 0.51. Measurement of palp and legs: Palp 1.11 [0.38, 0.10, 0.09, 0.54], leg I 2.18 [0.70, 0.36, 0.52, 0.32, 0.28], II 1.71 [0.55, 0.30, 0.35, 0.28, 0.23], III 1.81 [0.58, 0.25, 0.34, 0.36, 0.28], IV 2.06 [0.68, 0.29, 0.45, 0.41, 0.23]. Leg formula: 1342. Spination. Palp: spineless; Legs: femur I spineless, II do 1, III rl 1 do 2 IV do 3; patellae I–IV spineless; tibia I rlv 1 v 1, II–IV spineless; metatarsi I rlv 2 plv 2, II spineless, III pl 1 plv 1 rlv 1 v 1, IV rlv 1 plv 1; tarsi I–IV spineless. In all respects as female, except as follows: Carapace darker than female with lighter ocular region, with black margins (Figs 4, 13 & 15), densely covered with white setae on sides and anterior ocular region, posterior ocular half and dorsal region covered with orange hairs (Figs 13, 15). Clypeus light brown, lateral sides with two pairs of long black setae (Fig. 19). Endites, labium, sternum light reddish brown (Fig. 14). Leg I strong, robust, orange-brown (Figs 13, 15). Legs II & III creamy white except femur, light

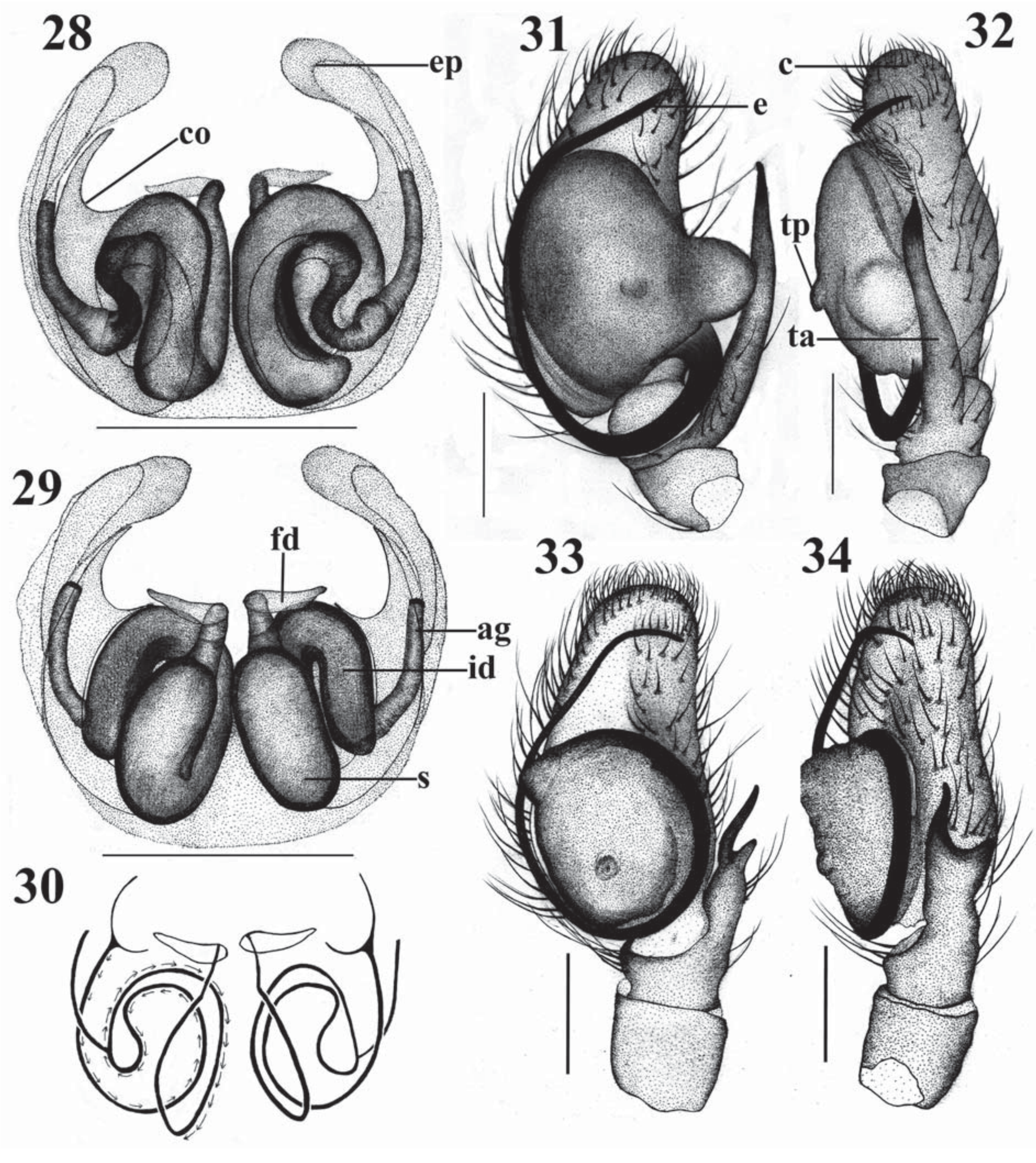


Figs 23–27. Genitalia of *Afraflacilla miajlarensis* sp.n.: 23 — epigyne, ventral view; 24 — same, dorsal view; 25 — male palp, prolateral view; 26 — same, ventral view; 27 — same, retrolateral view. Scale bar: 0.2 mm.

Рис. 23–27. Гениталии *Afraflacilla miajlarensis* sp.n.: 23 — эпигина, вентрально; 24 — то же, дорсально; 25 — пальпа самца, пролатерально; 26 — то же, вентрально; 27 — то же, ретролатерально. Масштаб: 0,2 мм.

brown (Fig. 13). Leg IV light brown except patella, creamy white (Fig. 13). Abdomen oval, light brown, with creamy dots, with a broad light yellowish brown longitudinal medial stripe extending the entire length of the abdomen dorsally, with creamy white transverse stripes laterally (Figs 13, 15); abdomen dorsally covered with light brown setae, with longitudinal stripes of white setae laterally (Figs 13, 15). Venter light brown, with irregular white patches, covered with short white setae; lateral region darker with numerous longitudinal white dot lines (Fig. 14).

Palp (Figs 25–27, 33–34). Palp light brown, with yellow patella; tibia short, RTA long, dark brown, dagger-like, upwardly directed with sub-acute tip, sparsely covered with black setae (Figs 27, 32); tegulum ovoid, light brown, with large retrolateral lobe, and a medial blunt outgrowth (Figs 26, 31); embolus elongate, starting at 4 o’ clock position (at



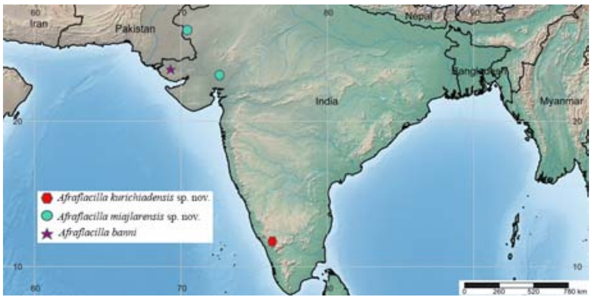
Figs 28–34. Genitalia of *Afraflacilla miajlarensis* sp.n. (28–32) and *Afraflacilla kurichiadensis* sp.n. (33–34): 28 — epigyne, ventral view; 29 — same, dorsal view; 30 — diagrammatic course of insemination ducts; 31, 33 — male palp, ventral view; 32, 34 — same, retrolateral view. Abbreviations: ag — accessory gland, c — cymbium, co — copulatory opening, e — embolus, ep — epigynal pocket, fd — fertilization duct, id — insemination duct, s — spermatheca, ta — retrolateral tibial apophysis, tp — tegular process. Scale bar: 0.2 mm.

Рис. 28–34. Гениталии *Afraflacilla miajlarensis* sp.n. (28–32) и *Afraflacilla kurichiadensis* sp.n. (33–34): 28 — эпигина, вентрально; 29 — то же, дорсально; 30 — схема расположения копуляторных каналов; 31, 33 — пальпа самца, вентрально; 32, 34 — то же, ретролатерально. Сокращения: ag — дополнительная железа, c — цимбиум, co — копуляторное отверстие, e — эмболюс, ep — карман эпигины, fd — оплодотворительный канал, id — копуляторный канал, s — сперматека, ta — ретролатеральный вырост голени, tp — вырост тегулума. Масштаб: 0,2 мм.

ventral view), partly surrounds the bulb, distal region directed retrolaterally (Figs 27, 32).

HABITAT. Found in arid regions of Thar Desert, with *Lasiurus scindicus* and *Cenchrus biflorus* dominated vegetation.

ETYMOLOGY. The specific epithet is a noun derived from the name of the type locality (Miajlar) from where the species was collected.



Map. Collecting localities of *Afraflacilla* species in India.
Карта. Места сбора видов *Afraflacilla* в Индии.

Afraflacilla kurichiadensis Sudhin, Nafin et Sudhikumar, **sp.n.** Figs 7–9, 33–34, 35–40, Map.

TYPE MATERIAL. HOLOTYPE: ♂ (CATE 8708A) from the Wayanad Wildlife Sanctuary (11°45′27.6″N 76°14′50.5″E), Kurichiad range, Wayanad district, Kerala, India, 916 m a.s.l., 7.06.2015, P.P. Sudhin & K.S. Nafin.

DIAGNOSIS. The male of *Afraflacilla kurichiadensis* sp.n. closely resembles *Afraflacilla ballarini* Cao et Li, 2016., by having almost similar embolus and body pattern, but can be distinguished by the following combination of characters: RTA robust, elongate, with bifurcated tip (RTA short without bifurcated tip in *A. ballarini*); embolus starting at 1 o' clock position (9 o' clock position in *A. ballarini*); tegulum with anterior protrusion (posterior protrusion in *A. ballarini*) (compare figs 33–34, 38–40; with figs 1A–D, 2A–B in Cao *et al*., 2016).

DESCRIPTION. **Male** (CATE 8708A) (Figs 7-9, 33-34, 35-40). Measurements: Body length 4.08. Carapace length 1.85, width 1.20, height at PLE 0.59. Abdomen length 2.17, width 1.13. Ocular area length 0.90, width 0.97. Eye diameters: AME 0.31, ALE 0.16, PME 0.06, PLE 0.16. Eye interdistances: AME–ALE 0.03, PME–PME 0.82, ALE–ALE 0.65, PME–PLE 0.15, PLE–PLE 0.78, ALE–PME 0.22. Length of chelicera 0.69. Measurement of palp and legs: Palp 1.37 [0.52, 0.15, 0.14, 0.56], leg I 3.72 [1.14, 0.62, 1.08, 0.53, 0.35], II 2.14 [0.72, 0.27, 0.49, 0.39, 0.27], III 2.56 [0.77, 0.32, 0.54, 0.58, 0.35], IV 2.24 [0.10, 0.41, 0.74, 0.62, 0.37]. Leg formula: 1342. Spination. Palp: femur do 2; Legs: femur I spineless, II–IV pl 1 rl 1 do 3; patellae I–IV spineless; tibia I plv 1, II spineless, III pl 1 rlv 1, IV rl 1 plv 1, IV pl 1 rl 1 do 2; metatarsi I–II rlv 2 plv 2, III pl 1 rl 1 plv 1 rlv 1, IV rl 1 rlv 1 plv 1; tarsi I–IV spineless.

Carapace oval, rather flattened, reddish brown, covered with white setae, with black lines marginally (Figs 35, 37); ocular region reddish black, slightly wider than long, more darker around eye regions, covered with short white setae and long curved brown setae (Fig. 35); clypeus very low, reddish brown, densely covered with short white setae. Chelicerae reddish brown, less vertical, frontal face slightly sloping retrolaterally, with black longitudinal lines prolaterally, promargin with two closely arranged medial teeth, and retromargin with a single tooth; endites greyish brown, longer than wide, broad distally, with grey hairs on their inner margins, dorsally with few brown setae; labium brown, covered with black setae (Fig. 36); sternum oval, yellowish brown, covered with white setae, sternal margin with black lines (Fig. 36). Pedicel light yellowish, with lateral black mottling. Leg I strong, robust, reddish brown (Figs 22, 35–36). Remaining legs light yellowish brown, with light reddish-brown markings on all femora, patellae, tibiae and metatarsi IV (Figs 35–36). All legs with long setae. Abdomen oval, light brown, dorsally with several light yellowish irregular patches, laterally with a longitudinal white band formed of white hairs, and several longitudinal brown bands (Figs 35, 37). Venter light greyish brown, with several brown mottling (Fig. 36). Spinnerets brown in colour.

Palp (Figs 33–34, 38–40). Femur light brown, distally with a small bud-like ventral outgrowth; patella and tibia light yellowish brown; tibia short, RTA robust with bifurcated tips, ventral one longer, thumb-like, upwardly directed with sub-acute tip, dorsal one short, tooth-like, directed at 2 o' clock position (Figs 34, 40); cymbium reddish brown, distally light yellowish, covered with white setae (Figs 38, 40); tegulum ovoid, light brown, with anterior protrusion and blunt outgrowth on posterior mid-section (Figs 33, 39). Embolus elongate, starting at 1 o' clock position (at ventral view), coiled once around the bulb, distal region directed retrolaterally, tip slightly bent downwards (Figs 33, 39).

Female. Unknown.

HABITAT. Occurs in the moist deciduous forests of Western Ghats.

ETYMOLOGY. The specific epithet is an adjective derived from the name of the forest range (Kurichiad) from where the species was collected.

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Compliance with ethical standards

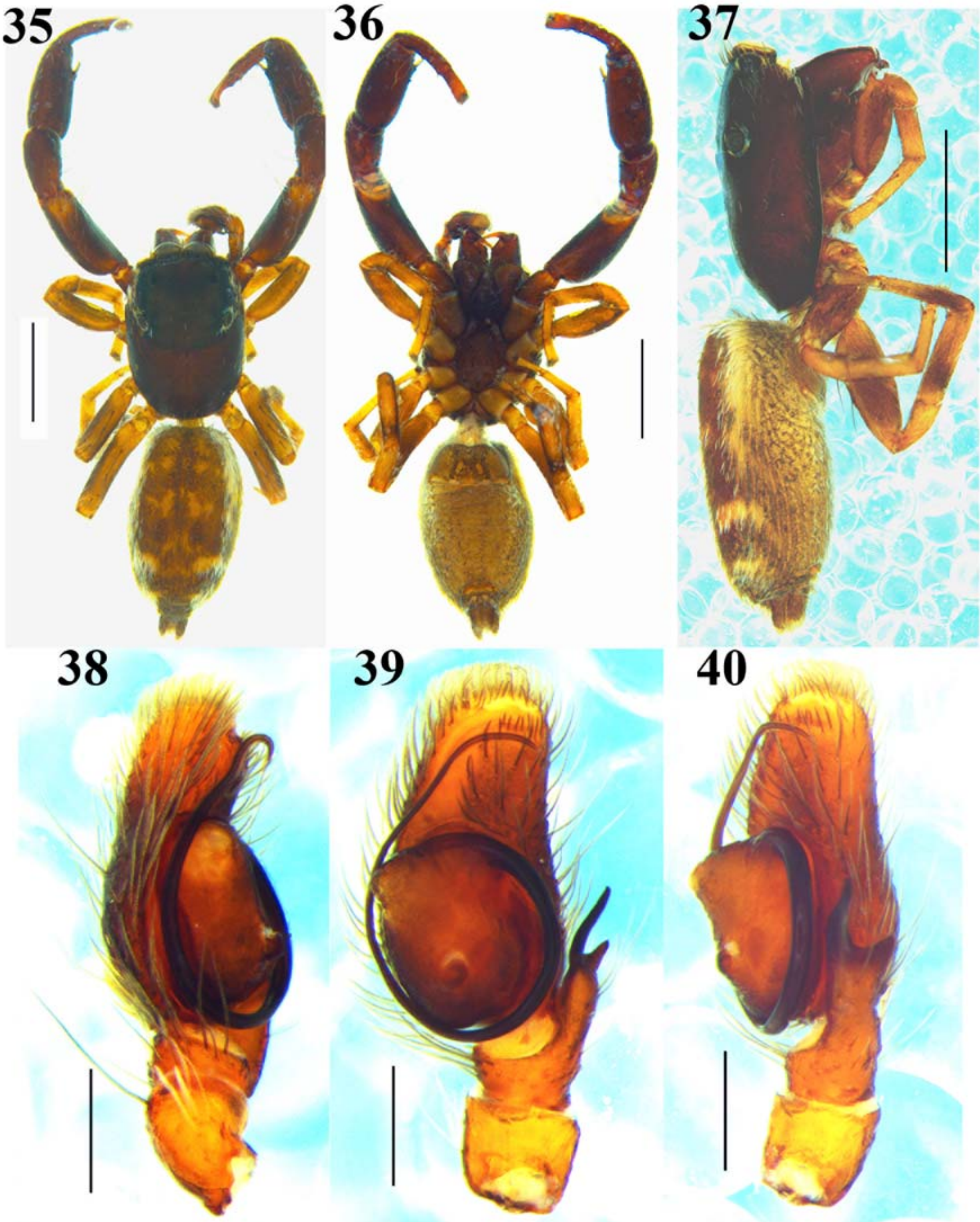
Conflict of interest: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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Figs 35–40. *Afraflacilla kurichiadensis* sp.n.: 35 — male habitus, dorsal view; 36 — same, ventral view. 37 — same, lateral view; 38 — male palp, prolateral view; 39 — same, ventral view; 40 — same, retrolateral view. Scale bar: 35–37 — 1 mm, 38–40 — 0.2 mm.

Рис. 35–40. *Afraflacilla kurichiadensis* sp.n.: 35 — внешний вид самца, дорсально; 36 — то же, вентрально. 37 — то же, латерально; 38 — пальпа самца, пролатерально; 39 — то же, вентрально; 40 — то же, ретролатерально. Масштаб: 35–37 — 1 мм, 38–40 — 0,2 мм.

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